

CALIFORNIA ENERGY COMMISSION

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SACRAMENTO, CA 95814-5512



March 25, 1999

Mr. Andrew Welch
High Desert Power Project, LLC
3501 Jamboree Road, South Tower Suite.
Newport Beach, CA 92660

Dear Mr. Welch:

On March 9, 1999, the High Desert Power Project (HDPP) Committee issued a Second Prehearing Conference and Scheduling Order, directing staff to file revisions or supplemental analysis concerning handling and transportation of hazardous material and cultural resources on March 25, 1999. The purpose of this submittal is to transmit staff's revisions supplemental analysis for Hazardous Material Management and Traffic and Transportation. Our Cultural Resource revisions will be provided on April 9, 1999. The purpose of staff revisions for Cultural Resources is to address recent changes in the California Environmental Quality Act guidelines.

If you have any questions, please call me at (916) 653-1614, or E-mail me at rbuell@energy.state.ca.us.

Sincerely,

Richard K. Buell
Siting Project Manager

Enclosure

cc: Proof of Service, 97-AFC-1

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TRAFFIC AND TRANSPORTATION

Errata to the Testimony of Keith Golden and [Gregory M. Newhouse](#) [David Flores](#)

1. SA Page 145, replace the paragraph under heading “**Truck Traffic**” with the following:

TRUCK TRAFFIC

The transportation and handling of hazardous substances associated with the project can increase roadway hazard potential. (See AFC 5.4.5.2 for a general discussion.) The handling and disposal of hazardous substances are also addressed in the Waste Management, the Workers Safety and Fire Protection, and the Hazardous Materials Management sections of this SA.

In the February 17, 1999 letter from Ms. Lizanne Reynolds representing the California Unions for Reliable Energy (“CURE”), she reiterated their concern as to potential ammonia transportation accidents. Their conclusion was the risk associated with the transport of ammonia to the project site had not been adequately addressed in the Staff Analysis (SA). They further concluded that, “we believe the SA should include an ammonia transportation accident in its analysis and should impose conditions to mitigate the impacts associated with such an accident”.

CURE prepared an analysis which concluded that the probability of a catastrophic tanker truck accident using procedures recommended by various individuals and organizations [i.e. Menzie, Federal Emergency Management Agency (FEMA), etc.] could exceed a 1 in 1,000,000 ratio over the life of the project. CURE determined that there is a 6% chance of an accidental release over the project life.

Staff reviewed the analyses and assumptions provided in CURE’s letter, and recognize that the probability of a tanker truck failure could exceed the 1 in 1,000,000 ratio over the life of the project, based upon their assumptions. Staff does not negate CURE’s assumptions but concludes that preparing risk numbers is speculative in nature, and that outcomes can vary dependent upon the information used to reach a conclusion.

As stated in the AFC, there are two potential truck routes for the delivery of aqueous ammonia; Interstate 15 to U.S. 395 north for approximately 9 miles to Alento Road, from there to Airport Blvd east to El Evado Road to the project site. Total mileage from Interstate 15 to the project site is estimated to be 15 miles. Along this route are adequate passing lanes (approximately every two miles) along U.S. 395, which is a two-lane highway. Four-way traffic signals are provided at major intersections, and adequate shoulders are provided along this route for emergency turnout. From a field investigation, approximately 30% of U.S. 395 use is by commercial truck traffic. Air Base Road is a four-lane road with four-way signals at major intersections and no visual obstructions to El Evado Road. As discussed earlier in the report, El Evado Road is a recently built roadway that provides access to the

airport and to the project site. There is no development along this four-lane route to the project site.

The second route would be from State Highway 15 to National Trails Highway, approximately two miles north to Air Base Road west to El Evado Road to the project site. A portion of the National Trails Highway is four lanes (from State Highway 15 north for approximately one mile) and reduces to a two-lane highway. Major industries (cement factory, mill, rock quarry) are located along this route which create the potential of commercial trucks crossing or entering onto the roadway. The National Trails Highway pavement is in good condition with no visual obstructions, and a sufficient left lane is provided from the highway onto Air Base Road. The approximate mileage from State Highway 15, along National Trails Highway to the project site is 10 miles. There are no railroad crossings along either access routes to the proposed project.

Staff's visual observations of the roadway system from Interstate 15 to the proposed project site, taking into account the two possible truck routes, indicate that there are no unusual hazards and that the roadways can sufficiently and safely handle the delivery of aqueous ammonia by approximately 15 trucks per month without incident.

All drivers who carry hazardous materials are specifically licensed by the State Department of Motor Vehicles. Drivers are required to carry a manifest, available for inspection by the California Highway Patrol inspection stations along major highways and interstates; the check for weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are also required to take first aid instruction and procedures on handling hazardous waste spills.

Truck tank design for the aqueous ammonia and other hazardous materials are federally mandated by DOT specifications and are designed for impact safety.

Staff analyzed potential safety hazards related to aqueous ammonia truck deliveries for the purpose of assuring that necessary measures are in place at the federal, state, local, and the industry level to ensure public safety.

For the purposes of responding to the concerns of CURE, the transport of aqueous ammonia along public roadways has been addressed by staff, with a conclusion that roadway designs along both truck routes are adequate, with no safety improvements needed. In addition, U.S. 395 has been approved by the California Highway Patrol as a roadway for use in the transportation of inhalation related hazardous materials (AFC Section 5.4.5.2, pg.5.4-17).

Staff has not addressed the transport of ammonia (highway accident, roadway conditions) on Interstate 15 or other interstate highways because these roads are used continuously by commercial trucks and the traveling public. The focus of this safety analysis is as the aqueous ammonia truck deliveries leave the Interstate to the project site.

As provided in the Laws, Ordinances, Regulations and Standards (LORS) section of this report, federal and state regulations are in place to insure that the handling and transportation of hazardous materials are done in a manner that protects public safety. Federal laws specific to this issue are Title 49, Code of Federal Regulations, Sections 350-399 and Appendices A-G, of the Federal Motor Carrier Safety Regulations. These sections address safety considerations for the transport of goods, materials, and substances over public highways.

The California Vehicle Code and the Streets and Highways Code (Sections 31600 through 34510) are equally significant to insure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol.

Based upon compliance with the current state and federal regulations that are in place, potential impacts of the transportation of hazardous substances can be reasonably assumed to reduce any risk to an acceptable level. Mitigation measures and conditions of certification that ensure this compliance are discussed under Waste Management, the Workers Safety and Fire Protection, and the Hazardous Materials Management sections in this SA.

HAZARDOUS MATERIAL MANAGEMENT

Supplemental Testimony of Rick Tyler and Joe Loyer

INTRODUCTION

On February 17, 1999, California Unions for Reliable Energy (CURE) filed comments on the January 21, 1999 Staff Assessment (SA). The purpose of this Supplemental Testimony is to provide staff's responses to CURE's comments.

CURE COMMENT SA PAGES 86-87 — AMMONIA TANK RELEASES

COMMENT

In CURE's comments regarding staff's Hazardous Material Management analysis, CURE argues that staff's estimate of the probability of failure for the aqueous ammonia tank is incorrect, based on the probability of pressure vessel failure for one tank-year of operation, which should be multiplied by the 30 year life of the facility.

RESPONSE

Staff agrees that the estimated yearly storage failure rate can be multiplied by a factor of 30 to obtain a lifetime risk of failure. It should also be noted that staff's analysis reflects many other simplifying assumptions which cause significant over-estimation of the risk. If this analysis were to be performed again, numerous other analytical refinements should also be included. Such refinements would have the effect of reducing the estimated risk of impact. For example, it is not tank failure *per se* that is the primary concern, but rather the probability of significant impact on the public. In order to produce public impacts, the tank failure would have to occur in conjunction with very pessimistic meteorological conditions (F stability, 1 meter/second wind speed, winds in the direction of public receptors, and 90 degree F ambient temperatures). Based on data supplied in the AFC, such low winds in the direction of the nearest public receptors occur about 5% of the time. F stability and 90 degree F ambient temperatures occur less than .025% of the time. If all of these assumed conditions fail to occur, the result is a significant decrease in the downwind impacts. For example, an increase in wind speed from 1 meter/second to 2 meters/second decreases the downwind impacts by 50%. Decreasing the assumed temperature of the bulk aqueous ammonia to 60 degrees F from 82.5 degrees F would reduce downwind impacts by 38%. If winds result in transport of released material in a direction where no receptors are present, then no impact would result.

Another factor resulting in over-estimation of impact is the use of a simplified model for analysis of the emission rate from the aqueous ammonia surface. This model assumes turbulent mass transfer, and that the pool is a pure liquid. While turbulent mass transfer is assumed for purposes of estimating the emission rate from the ammonia pool surface, this is inconsistent with the 1 meter/second wind speed used in the dispersion model. The use of laminar mass transfer coefficients, as opposed

to turbulent coefficients, results in more than an order of magnitude decrease in estimated downwind concentrations. The assumption of a pure substance assumes that 100% of the surface is effectively ammonia at the partial pressure of the ammonia in solution. Further, the model neglects any resistance to mass transfer of ammonia between the bulk liquid and the surface where mass transfer occurs. It is staff's belief that this results in an over-estimation of downwind impacts by approximately one order of magnitude.

Staff believes that the screening approach used in estimating potential for impact remains conservative and that further refinements to the analysis would reduce the estimate of risk by a factor greater than 30.

COMMENT

CURE maintains that staff incorrectly used the lower probability estimate for spontaneous tank failure of 1 in 100,000/yr rather than the higher estimate of 1 in 10,000/yr. This was incorrect because the 1 in 10,000/yr rate is more protective and is supported by a study of 100 accidental releases (Baldock 1980).¹

RESPONSE

Staff used the lower estimate of tank failure because we do not believe the tanks considered in the study were representative of modern tanks. The data used to derive the failure estimate used in staff's analysis is based on evaluation of pressure vessel failures in tanks designed and built prior to the most recent design codes. Additionally, the vessels evaluated were not designed to seismic code. Modern codes reflect new design requirements to correct causes of past failures, which were reflected in the reported failure rates. Design to seismic code not only reduces probability of failure in the event of an earthquake but also results in increased wall thickness of the tank. Increasing the wall thickness of a tank reduces potential for failure from virtually all other causes as well.

It should be recognized that the study's estimates of failure are based on a very small number of failed tanks. None of the tanks that failed were designed to the standards applicable to the tank in question, and none were designed to seismic code for a hazardous materials handling facility located in seismic zone 4. Further, the tank will not be operated with high internal pressure, which causes large stresses in the tank walls and provides the energy to cause failure. (While staff originally believed that the tank would be operated at low pressure, this assumption was incorrect. The tank will, in fact, be vented to the atmosphere and will be at zero pressure.) The proposed atmospheric tank will be designed to API 650 design standards. Staff contacted API but was unable to obtain failure data representative of tanks designed to API 650 standards; it remains staff's contention that API 650 atmospheric vessels should be expected to have a lower failure rate than pressure vessels. Staff believes that this justifies the use of the lower estimate of failure as opposed to the higher estimate.

¹ P.J. Baldock, Accidental Releases of Ammonia: An Analysis of Reported Incidents, Loss Prevention, v. 13, 1980.

Moreover, estimates of spontaneous failure should not be confused with probability of accidental release as determined by the Baldock study. Spontaneous failures are failures in the absence of precipitating events. As noted in CURE's comments, probability of accidental release could result from design failures, human error, or external factors. The proposed project includes a catch basin under the delivery area and a sump where spilled material would drain in the event of an accidental release. The diked area under the storage tank also drains to this sump. This mitigation precludes impacts from virtually any accident short of complete tank failure.

Staff also believes that accidental releases which could be caused by human errors and external events were separately evaluated and addressed by post-certification regulatory programs or by staff's proposed conditions of certification. For example, the tank will be designed to the appropriate seismic code, and its operation will be subject to federal, state and local Risk Management Program requirements. Additionally, staff examined the location of the tank relative to storage of flammable and explosive materials and for turbine overspeed accidents, and evaluated the risk posed by aircraft crash due to the tank's proximity to the nearby airport. Staff determined that no external hazards exist at the site which create a significant risk to the tank.

CURE also referenced a study (Balstone and Tomi 1980)²) which provides an estimate of atmospheric tank failure rate of 30 in 1,000,000 tank-years. While this estimate is higher than staff's estimate, it appears to include failures from all causes and is based on tanks built to various codes, used to store various types of materials over time. Therefore, not representative of a tank designed to seismic code and API 650 standards used to store aqueous ammonia. It is staff's belief that failure to factor in these considerations would in all likelihood significantly overestimate the risk posed by the tank in question.

It is still staff's conclusion that 1) the risk of significant impact on the public due to spontaneous failure of the tank is insignificant because the probability of a complete tank failure is insignificant, and that 2) risk of failure due to other causes such as external events and human error is insignificant, addressed by post certification programs, proposed mitigation measures, or measures resulting from staff's proposed conditions of certification.

CURE COMMENTS SA PAGES 87-88 — AIRCRAFT ACCIDENTS

COMMENT

Cure maintains that staff's analysis underestimates the potential for an accidental release of aqueous ammonia resulting from an aircraft collision with the tank.

² R.J. Batstone and D.T. Tomi, Hazard Analysis in Planning Industrial Developments, Loss Prevention, v. 13, 1980, pp. 7-14.

CURE argues that staff's analysis is in error and that the risk of accidental release associated with an aircraft crash into the ammonia storage tank should be 1.68 in 1000 over the life of the project as opposed to the 1.2 in 1,000,000 risk estimated by staff. To reach this result, CURE rejected staff's use of only flights on the secondary runway closest to the tank and multiplied the yearly probability by 30 to reflect the risk over the life of the project

RESPONSE

In general, aircraft crashes are much more probable in close proximity to airports. However, staff disagrees with the assertion that the flights from the main runway should be considered. To derive its estimate of risk, staff used the Airport Use Planning Handbook, which provides zones of increased crash probability around runways. The tank is in the zones of increased crash probability for the secondary runway but is outside the zones of increased probability for the primary runway. Staff concludes that there is no significant increase in risk to the tank, as a result of its proximity to the primary runway, compared to any other location not near an airport.³ Staff therefore finds no basis for including flights from the main runway in the risk estimate. Based on CURE's comments regarding the staff analysis and the above, staff believes that the yearly probability should be estimated by the following expression:

$$(800 \text{ sq. ft.}) / (43,560 \text{ sq. ft./acre}) (.0005/\text{acre}) (.35) (3000/100,000) = \\ 9.6 \text{ in } 100,000,000$$

where 800 sq. ft. is the area occupied by the tank,

.0005 is the probability of crash associated with each acre of the crash zone,

.35 is the number of crashes in general at U.S. airports per 100,000 flights (a takeoff and landing), and

3000 is the number of flights (takeoffs + landings) from the airport.

9.6 in 100,000,000 is an insignificant level of risk, and requires no further mitigation.

As stated in our response above regarding ammonia tank releases, staff did not include the probability of pessimistic meteorological conditions that would reduce the probability of impact. The same meteorological factors that reduce the risk of public impact in the event of spontaneous failure of the tank also apply to risk of impact in the event of failure due to aircraft crash.

It should also be noted that the 1 in 1,000,000 criterion used by staff is not a significance threshold as stated by CURE. Staff uses this criterion as a *de minimus* criterion (a level which is clearly not significant). When risks are above this level, staff will first attempt to refine the analysis, then look at reasonable and feasible mitigation. In the absence of reasonable mitigation to further reduce the risk of

³ The probability of a crash is less than .0002 per acre outside Zone 6.

impact, staff may recommend that the Energy Commission accept a risk greater than 1 in 1,000,000. It is the Commission's responsibility to determine acceptable risk. It should also be noted that risks of 1 in 100,000 or greater have frequently been found acceptable by other regulatory agencies.